

Air Dispersion Modeling Report – 2010 SO₂ NAAQS Designation North Valmy Generating Station, Nevada

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1. INTRODUCTION

On June 22, 2010, the Environmental Protection Agency (EPA) revised the primary National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO₂) by promulgating a new primary SO₂ standard at a level of 75 parts per billion (ppb) (196 µg/m³), based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. Primary National Ambient Air Quality Standard for Sulfur Dioxide, Final Rule.¹ The final rule was effective on August 23, 2010.

August 21, 2015 the EPA published the final Data Requirements Rule (DRR) (40 CFR Part 51, Subpart BB) for the 2010 1-hour SO₂ primary NAAQS (effective on September 21, 2015).² Per the requirements of the DRR, the Nevada Division of Environmental Protection (NDEP) sent a list to EPA identifying one source, North Valmy Generating Station (Valmy) that exceeded 2,000 tons per year (tpy) of SO₂ emissions. Per the DRR for each area identified that would be characterized through air quality modeling, a modeling protocol was required to be submitted to the EPA Regional Administrator by July 1, 2016. June 24, 2016 the NDEP submitted a modeling protocol for Valmy to the EPA. The Modeling Protocol described the NDEP's methodology for conducting the modeling analysis. The DRR also requires for sources proposed to be characterized by modeling, that a modeling analysis be conducted and submitted to the EPA Regional Office by January 13, 2017.

NDEP conducted modeling per the requirement of 40 CFR Part 51, Subpart BB § 51.1203(d)(2), which states that "Modeling analyses shall characterize air quality based on either actual SO₂ emissions from the most recent 3 years, or on any federally enforceable allowable emission limit or limits established by the air agency or the EPA and that are effective and require compliance by January 13, 2017." The NDEP chose to conduct a modeling analysis for Valmy based on the most recent three years of SO₂ emissions. Deviations from the Modeling Protocol are described in this Modeling Analysis Report.

2. BACKGROUND VALUES UPDATE

As noted in the Modeling Protocol, background was estimated using the approach described in the Draft EPA "SO₂ NAAQS Designations Modeling Technical Assistance Document, February 2016"³ (Modeling TAD) for the monitored SO₂ concentrations reported by all the three stations around the facility. Three years of hourly observations, 2012, 2013 and 2014, were used for the analysis.

The background seasonal values were recalculated for the modeling analysis and are shown below in Table 1. The previous background values shown below in Table 2 submitted in the Modeling Protocol Report, were the result of calculations that included hourly invalid entries that were not removed in the data spreadsheets received from the facility. There were 14 invalid entries in the data spreadsheet files for 2014 and two invalid entries in the data files for 2012. These were anomalous values due to calibrations or span/precision/zero checks recorded in the hard copy of the reports from the facility. 2013 had no corrections required to the data files. As a result, the recalculated background winter values

¹ <https://www.gpo.gov/fdsys/pkg/FR-2010-06-22/pdf/2010-13947.pdf> (last viewed 12/9/2016)

² <https://www.gpo.gov/fdsys/pkg/FR-2015-08-21/pdf/2015-20367.pdf> (last viewed 12/9/2016)

³ <https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf> (last viewed 12/12/2016)

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changed for hours 13 and 14 from 8.2 ppb to 8.1 ppb and 17.3 ppb to 8.0 ppb respectively. In addition the background spring values changed for hours 9 and 10 from 13.7 ppb to 5.9 ppb and 9.3 ppb to 6.3 ppb respectively. No other background values were changed.

Table 1. Current background seasonal values recalculated

**** Winter**

BACKGRND SEASHR 7.3 9.3 7.3 7.5 7.1 7.9
BACKGRND SEASHR 7.4 7.9 8.8 8.8 8.0 8.2
BACKGRND SEASHR 8.1 8.0 8.3 8.9 8.7 8.2
BACKGRND SEASHR 7.6 8.1 6.5 6.6 6.8 7.8

**** Spring**

BACKGRND SEASHR 2.2 2.6 2.2 2.4 3.0 2.8
BACKGRND SEASHR 4.2 4.2 5.9 6.3 4.0 3.6
BACKGRND SEASHR 2.4 3.1 3.4 2.6 3.0 2.2
BACKGRND SEASHR 2.4 2.3 2.1 2.0 2.2 2.6

**** Summer**

BACKGRND SEASHR 3.4 2.9 2.7 2.6 3.0 3.8
BACKGRND SEASHR 4.8 5.2 5.2 8.6 5.7 4.5
BACKGRND SEASHR 3.4 2.4 2.7 2.6 2.5 2.5
BACKGRND SEASHR 2.6 3.4 2.2 2.4 3.0 3.1

**** Fall**

BACKGRND SEASHR 3.6 4.2 3.4 3.3 4.0 3.3
BACKGRND SEASHR 4.0 3.5 3.5 3.4 4.8 4.2
BACKGRND SEASHR 8.0 4.3 3.3 3.5 4.1 3.7
BACKGRND SEASHR 4.0 3.7 3.9 3.5 4.1 3.6

Table 2. Previous background seasonal values as reported in the Modeling Protocol

**** Winter**

BACKGRND SEASHR 7.3 9.3 7.3 7.5 7.1 7.9
BACKGRND SEASHR 7.4 7.9 8.8 8.8 8.0 8.2
BACKGRND SEASHR 8.2 17.3 8.3 8.9 8.7 8.2
BACKGRND SEASHR 7.6 8.1 6.5 6.6 6.8 7.8

**** Spring**

BACKGRND SEASHR 2.2 2.6 2.2 2.4 3.0 2.8
BACKGRND SEASHR 4.2 4.2 13.7 9.3 4.0 3.6
BACKGRND SEASHR 2.4 3.1 3.4 2.6 3.0 2.2
BACKGRND SEASHR 2.4 2.3 2.1 2.0 2.2 2.6

**** Summer**

BACKGRND SEASHR 3.4 2.9 2.7 2.6 3.0 3.8
BACKGRND SEASHR 4.8 5.2 5.2 8.6 5.7 4.5
BACKGRND SEASHR 3.4 2.4 2.7 2.6 2.5 2.5
BACKGRND SEASHR 2.6 3.4 2.2 2.4 3.0 3.1

**** Fall**

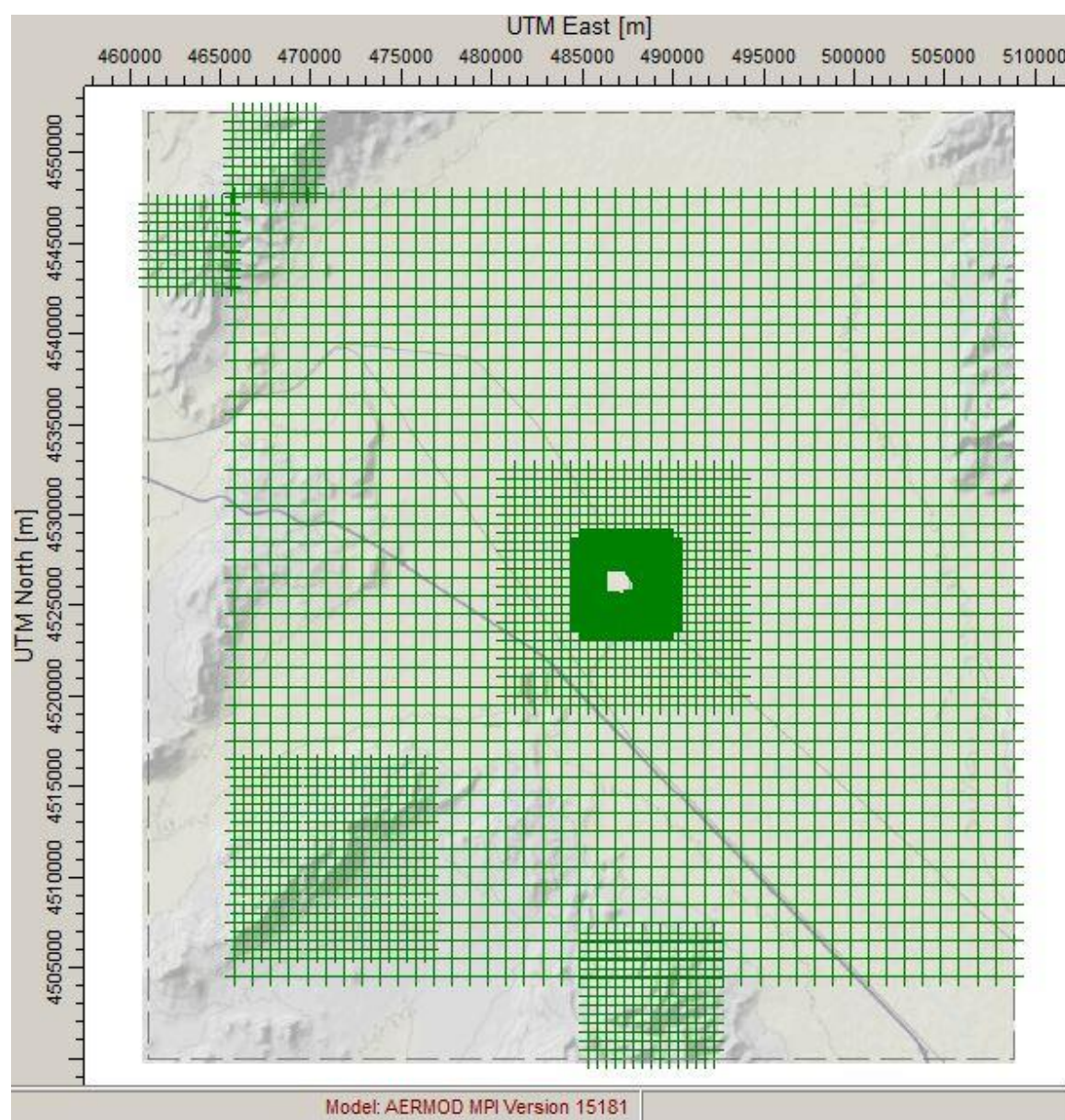
BACKGRND SEASHR 3.6 4.2 3.4 3.3 4.0 3.3
BACKGRND SEASHR 4.0 3.5 3.5 3.4 4.8 4.2

BACKGRND SEASHR 8.0 4.3 3.3 3.5 4.1 3.7
BACKGRND SEASHR 4.0 3.7 3.9 3.5 4.1 3.6

3. RECEPTOR GRID UPDATE

Basically the same receptor grid was used for the modeling analysis as was proposed in the Modeling Protocol. The difference was that an additional detailed receptor grid was added to the existing proposed receptor grid at 500 meter spacing in the southwest portion of the modeling domain. This was done to show more detail of the contoured results in the modeling domain. Figure 1 shows the new revised receptor grid for Valmy.

Figure 1. Full Valmy Receptor Grid – Revised

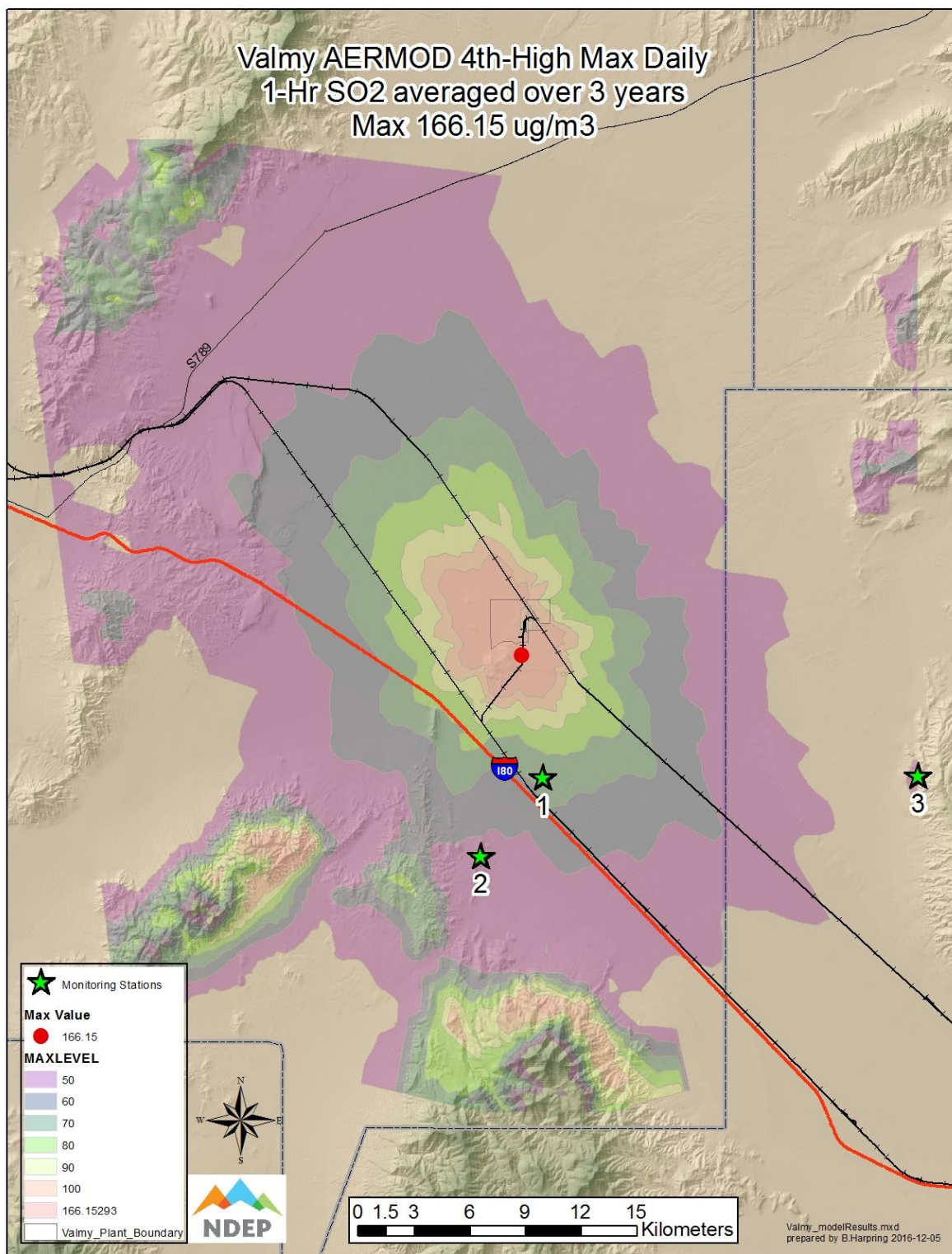


4. SUMMARY OF MODELING RESULTS

As specified in the Modeling Protocol the NDEP conducted air dispersion modeling using AERMOD v. 15181, the most current version available at the time of the modeling in accordance with 40 CFR Part 51 Appendix W. This version of AERMOD did not have approved beta options, thus only standard defaults were used. Consistent with the Modeling Protocol, AERMOD was run using meteorological data from years 2012, 2013 and 2014, and emissions data from years 2013, 2014 and 2015. The Modeling TAD was used as guidance for modeling ambient air in proximity to the SO₂ emission source to establish air quality data for comparison to the SO₂ NAAQS for the purposes of designations. Modeling was conducted with the recalculated background values and the revised receptor grid.

Modeling demonstrated that ambient concentrations of SO₂ at Valmy would be below the 3-year average of the annual (99th percentile) daily maximum 1-hour average concentration less than or equal to 75 ppb. The 4th high max daily 1-hour 3-year average value at Valmy was 166 µg/m³ (63 ppb), which equates to 85% of the standard. Figure 2 below shows the results of the AERMOD modeling analysis. The Valmy plant boundary is indicated by a polygon/circular segment. The maximum daily 1-hour 3-year average (166.15 µg/m³) is indicated by a red dot approximately 700 meters south of the plant boundary. The highest concentrations are centered around Valmy.

Figure 2. Spatial display of 3-year Average 99th Percentile Annual Distribution of Daily Maximum 1-hr SO₂ Concentrations at Valmy



5. FUTURE COMMITMENTS

Per the SO₂ DRR Subpart BB § 51.1205(b) “Ongoing data requirements, for modeled areas”, the NDEP intends to submit an annual report to the EPA Regional Administrator by July 1 of each year following the calendar year after the effective date of the area’s initial designation. The report will include a recommendation regarding whether additional modeling is needed to characterize air quality in any area to determine whether the area meets or does not meet the 2010 SO₂ NAAQS.

6. APPENDICES

The following modeling files are provided in electronic format on a compact disk. Model input, output, and data files are provided.

APPENDIX	FILENAME	DESCRIPTION OF FILE
APPENDIX A	2016-06-24_North Valmy Modeling Protocol 2015 SO ₂ DRR.pdf	Modeling Protocol Report June 24, 2016
APPENDIX B	Valmy_13_14_15_final_Nov10.ADI	AERMOD Input file
APPENDIX C	Valmy_13_14_15_final_Nov10.ODI	AERMOD Output file
APPENDIX D	emission_B01_B02_2013_2014_2015.prn	Continuous Emission Monitoring System (CEMS) emissions data for Boiler 1 and Boiler 2
APPENDIX E	SO ₂ _background_year.txt	Background data file
APPENDIX F	Receptors_w-SW.rec	Receptor grid file
APPENDIX G	<ul style="list-style-type: none"> i. Valmy_2013-14-16_15181_01.SFC ii. Valmy_2013-14-16_15181_01.PFL 	AERMET meteorological output files: <ul style="list-style-type: none"> i. Surface boundary layer data (*.sfc) ii. Profile data (*.pfl)
APPENDIX H	<ul style="list-style-type: none"> i. 01H4GALL.PLT ii. PEH4GALL.PLT iii. MXDYBYR_ALL_SO₂.DAT iv. MAXDAILY_ALL_SO₂.DAT 	Output plot files: <ul style="list-style-type: none"> i. Plot file of 4th-Highest Max Daily 1-Hr values averaged over 3 years for source group ALL ii. Plot file of Period values averaged across 3 years for source group ALL iii. File of ranked daily maximum 1-Hr values by year for source group ALL iv. File of daily maximum 1-Hr values by day for source group ALL

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APPENDIX A. Modeling Protocol for North Valmy Generating Station, Nevada

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